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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/631,857 | 08/01/2003 | Makoto Matsukawa | 107156-00196 | 9151 |

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| EXAMINER | |
|---|---|
| SADULA, JENNIFER R | |
| **ART UNIT** | **PAPER NUMBER** |
| 1756 | |

DATE MAILED: 05/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/631,857 | MATSUKAWA ET AL. | |
| | Examiner | Art Unit | |
| | Jennifer R. Sadula | 1756 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *01 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Double Patenting*

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-6 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 6,692,809. Although the conflicting claims are not identical, they are not patentably distinct from each other because the present application fully encompasses the invention depicted in the patent.

### *Claim Objections*

Claims 5-6 are objected to because of the following informalities: there are misspellings (such as "silicone") and misappropriated units (such as "oxide" instead of "dioxide").

Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Applicants claim an information storage medium comprising a substrate having formed thereon on the following order: a dielectric layer, Ge-In-Sb-Te phase-change recording layer, a second dielectric layer and a reflective layer of Ag-Nd-Cu wherein the thicknesses of the layers are specified as well as the groove widths. Examiner notes that the specificity of the linear speed rotation and laser information are information pertaining to the use and thus do not impart limitations upon the device.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abiko et al., European Patent Publication No. 1 143 430 ("Abiko"), in view of in view of Fujii et al., U.S. Publication No. 2003/0143342 ("Fujii"), further in view of Nakayama et al., U.S. Patent No. 5,822,286 ("Nakayama").

Abiko teaches a substrate having corrugated and ridge-and-concavo-convex groove tracks wherein the recording material is a germanium-indium-antimony-tellurium (Ge-In-Sb-Te) alloy material containing 1-6 weight% (wt.%) of Ge, 2-6 wt.% of In, and ratio of Sb to Te is 2.4-3.0 times (0026-0027). The silver-palladium-copper (Ag-Pd-Cu) reflective alloy material contains 0.9-1.5 wt.% of palladium, and 0.9-1.1 wt.% of Cu (0028). Depth of a furrow on the substrate is 30-40 nm, and distance between two adjacent boundaries at opposite sides of the

furrow is 0.27-0.33 μm. Amplitude of the corrugation is 30-35 nm at 0-peak, thickness of the dielectric film (I) is 65-80 nm, thickness of the phase versatile recording film is 12-18 nm, thickness of dielectric film (II) is 12-20 nm, and thickness of the reflection film is 80-160 nm (abstract; 0016). Abiko further teaches the Applicants' intended use (0010-0012). The materials for the dielectric films are preferably ZnS-SiO2 (0023). Additionally, other materials such as GeOx may be used for the dielectric film thereby noting a separation between "layers" of dielectric materials (0083, 0023). The information storage disk for use at 650nm with a numeric aperture of 0.60 is further taught.

Fujii teaches reflective films for use in LCDs and other electrooptical devices (abstract) wherein the reflective film is an Ag-based alloy wherein on a three-component alloy of Ag--Nd--Cu, the amount of Nd was fixed to 0.7% as in Experiment Example 4, and study was conducted on the influence of Cu. The rate of change (%) of initial reflectivity and the rate of change over time (%) of reflectivity were evaluated by the same procedure as in Experiment Example 1. The results are shown in Table 5 (0012, 0028+, 0044) (see specifically #3-4 of table 5). The reflective film of Fujii is between 50-300nm (0035), preferably around 150nm and is for use at the same wavelength (650nm) as that of Tabata (0021). Fujii further teaches that while Ag-Nd-Cu is preferred for the ability of Nd to promote grain growth of Ag as well as the coalexcence of Ag atoms (0028), Pd may be further added for hardness (0032). As a result of the Ag-Nd, however, the anti-oxidative properties are improved (0034).

Nakayama teaches that the optical recording media, such as that of Abiko, preferably has pre-pits and groove depths which are set to be equal in an effort to facilitate easier manufacturing.

It would have been obvious to one of ordinary skill in the art at the time of invention to utilize the specific Ag-Nd-Cu (with potentially a Pd additive) reflective film of Fujii in replacement of the unspecified Ag-Pd-Cu film of Abiko with a reasonable expectation of forming an optical recording media comprising a high-modulated amplitude of the same thickness as specified by Abiko. Furthermore, it would be obvious to modify the combination of Abiko and Fujii with the pre-pit specificity of Nakayama with a reasonable expectation of forming a lowered cost of manufacturing optical recording media having improved anti-oxidative properties.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Abiko in view of Fujii in view of Nakayama, further in view of Miyamoto et al., U.S. Patent No. 5,805,565 ("Miyamoto").

The combination teaches the device substantially as claimed however fails to exemplify the range of pre-pit depth.

Miyamoto teaches a phase change recording medium wherien the pre-pits have the same depth as the grooves and are in the range of 40nm to 60nm (see claim 5).

It therefore would have been obvious to make the combination of Abiko/Fujii/Nakayama with the detailed pre-pit sizing of Miyamoto with a reasonable expectation of forming a low-production cost optical recording media having improved anti-oxidative properties. Examiner further notes that Abiko teaches that the depth of a furrow on the substrate is 30-40 nm, and thus the combination would satisfy the teaching of both Nakayama and Miyamoto in that the pre=pit depth and the groove depth are substantially the same.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Abiko in view of Fujii in view of Nakayama, n view of Miyamoto, further in view of Uno et al., U.S. Patent No. 6,503,690 ("Uno").

The combination teaches the claimed device however fails to teach the separative dielectric layers as claimed by Applicants' claims 5-6. Abiko does, however, teach that the materials for the dielectric films are preferably ZnS-SiO2 (0023), wherein additionally, other materials such as GeOx may be used for the dielectric film thereby noting a separation between "layers" of dielectric materials (0083, 0023).

Uno teaches an optical information recording media comprising a phase change recording layer including Ge, Te and Sb (abstract) wherein the dielectric layers further comprise diffusion preventing layers (7, 8) which preferably contain the oxides as taught by Abiko (such as SiO2, GeO, AlO etc) (6:41-51). These layers are to prevent a material from diffusing from or into the recording layer (6:52-65).

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use the additional prevention layers of Uno of the materials as specified by Abiko with a reasonable expectation of forming a successful recording media which is highly resistive to the elements.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Habuta et al., U.S. Publication No 2005/0079390 teaches that a reflective layer of Ag--Nd--Au is particularly preferable from the viewpoint of corrosion resistance. Particularly,

an alloy of Ag has a large thermal conductivity and is superior in humidity resistance, so is preferable as the material of the first metal layer 2 (0071).

Nishihara et al., U.S. Publication No. 2005/0074694 teaches that in particular Ag alloys , such as Ag--Nd--Cu have a high thermal conductivity, so that they are preferable as the material for the reflective layer 108. It is preferable that the film thickness of the reflective layer 108 is at least 30 nm, to attain sufficient heat diffusion (0123).

Tabata et al., U.S. Patent Publication No. 2004/0166440 teaches an optical storage medium comprising (see figure 1) a substrate, a first "protective layer", a recording layer, a second "protective layer" and a reflective layer wherein the recording layer comprises Ge-In-Sb-Te phase-change recording material in the atomic ratios as specified in the abstract. Examiner notes that Applicants' also refer to these layers as "protective layers (0059-0062). The recording layer is from 10-25nm for low power recording (0051). The reflective layer is further exemplified as Ag-Nd-Cu sputtered material (0136, 0179). With regard to the thickness of the reflective layer, Tabata teaches that the feasible thickness of the reflective layer 5 is in the range from 50 to 300 nm, depending on thermal conductivity of metal or alloy used for this layer, however example 12, which relies upon example 1 for this detail, exemplifies the reflective layer of 120nm. Each layer in figure 1 is noted in example 1. The grooves have a track pitch of 0.74 μm and a depth of 25nm. The "protective layers" are noted as dielectric materials such as ZnS and SiO2, which are the same as those listed in Applicants' claim 5. These protective layers are to protect the recording layer from heat that could otherwise cause deformation (0042). Tabata further teaches, with regard to additional dielectric layers, that it is preferable for the interface layers (which are provided on either side of the recording layer and therefore are between the

"protective layer" and recording layer) include at least one material such as nitrides, oxides and carbides however preferably the material is germanium nitride (0052-0053). The recording of the material is the same as the intended use as specified by the Applicants (see 0069-0074). Specifically, with regard to the ratios of materials for Applicants claim 3, examiner notes comparative sample 9 which specifies that the materials fall within the intended range (0166-0177). Examiner notes that while the width range is not specified, the ratio of width is wherein where grooves having a track pitch of 0.74 μm and a depth of 25 nm, a ratio of groove width to land width is roughly 40:60 (0081). Lastly, with regard to the reflective layer, although claim 4 is not anticipated, Tabata teaches that Ag is the measure component in either alloy for the reflective layer to offer high modulated amplitude, such as shown in the examples 1 and 12 (0179).

Deguchi et al., U.S. Patent Publication No. 2004/0105952 teaches a phase-change optical medium comprising a transparent plastic substrate, a specific groove formed on the substrate, and a thin film arranged thereon wherein the grooves are formed by injection molding (0013). The thin film formed on the substrate is a multilayer film basically comprising a lower protective layer, a recording layer, an upper protective layer, and a reflective layer formed on the substrate in this order. The lower and upper protective layers comprise, for example, an oxide, a nitride, or a sulfide, of which a mixture of ZnS and $SiO_2$ is often used. The recording layer comprises a phase-change material mainly comprising SbTe, such as Ge--In--Sb--Te and the like. The reflective layer comprises a metallic material, of which Al, Ag, Au, Cu, other metals, or an alloy of these metals is preferably used for their good optical properties and thermal conductivity. Preferably, the optical recording medium further includes a sulfuration-inhibiting layer and a

reflective layer arranged on the upper protective layer in this order; and a wobbled groove arranged on the optically transparent substrate, the wobbled groove has a track pitch of 0.74.+-.0.03μm, a groove depth of 22 nm to 40 nm, and a groove width of 0.17 μm to 0.30 μm, the lower protective layer includes a mixture of ZnS and $SiO_2$, the phase-change material in the recording layer mainly includes Sb and Te, the upper protective layer includes a mixture of ZnS and $SiO_2$, the sulfuration-inhibiting layer includes at least one of Si and SiC, and the reflective layer includes at least one of Ag and Ag alloys. The lower protective layer preferably has a thickness of 40 nm to 220 nm. The upper protective layer preferably has a thickness of 2 nm to 20 nm (0039). With regard to Applicants' claim 3, preferably the phase-change material in the recording layer further includes at least one selected from the group consisting of Ag, In, and Ge, the phase-change material has an atomic composition satisfying the following conditions: $0.010<In<0.080$, $0.600<Sb<0.800$, $0.100<Te<0.300$, and $0.010<Ge<0.080$, the atomic ratio of the total of Ag, In, and Ge to the total atoms in the phase-change material is from 0.050 to 0.090, and the atomic ratio [Ag/(Ag+In+Ge)] of Ag to the total of Ag, In, and Ge in the phase-change material is 0.10 or less.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer R. Sadula whose telephone number is 571.272.1391. The examiner can normally be reached on Monday through Friday, 10am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff can be reached on 571.272.1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MARTIN ANGEBRANNDT
PRIMARY EXAMINER
GROUP ~~1100~~ 1756

JRS
30 April 2005